ET-ARM BASE2103/2106

ET-ARM BASE2103 which is Board Microcontroller ARM7TDMI-S Core family uses Microcontroller 16/32-Bit 48 Pin low power type to be permanent MCU on board and uses MCU No.LPC2103/2106 from Philips. Board is designed a small size and easy to apply for various project works. MCU is arranged with necessary components as ETT Port 10PIN and uses Power Supply as +5V. Moreover, GPIO can support signal 5V. There is Connector UART0 (RS-232) 2 Ports for Download Hex File and using as RS232 Serial Port Communication for Program Application.

Specifications of Board if using LPC2106

- 16/32-Bit MCU ARM7TDMI-S family No.LPC2106 from Philips
- Crystal 19.6608 MHz; MCU can collect data maximum high speed 58.9824 MHz if using with Phase-Locked Loop (PLL)internal MCU
- Support In-System Programming (ISP) and In-Application Programming (IAP) through On-Chip Boot-Loader Software of Port RS232-1
- 1 Port JTAG 20PIN for Real Time Debugging
- 1 Port LCD standard ETT 14PIN
- 4 Port GPIO 10PIN standard ETT
- 128KB Flash Memory and 64KB RAM
- +5V Power Supply
- Maximum 32 I/O Pins GPIO (only GPIO supports signal 5V) Pin GPIO can be used with other functions as following;
    - ❖ SPI 1 Channel
    - ❖ I2C 1 Channel
    - ❖ UART Full-Duplex 2 Channel; RS232-1 and RS232-2 standard 4 Pin ETT
    - ❖ Timer 32-bit 1 Channel (7 Input Capture / 7 Output Compare)
    - ❖ Watchdog Timer
   - ❖ Real Time Clock
    - ❖ PWM Output 6 Output

Specifications of Board if using LPC2103

- 16/32-Bit MCU ARM7TDMI-S family No.LPC2103 from Philips
- Crystal 19.6608 MHz; MCU can collect data maximum high speed 58.9824 MHz if using with Phase-Locked Loop (PLL) internal MCU
- Support In-System Programming (ISP) and In-Application Programming (IAP) through On-Chip Boot-Loader Software of Port RS232-1
- 1 Port JTAG 20PIN for Real Time Debugging
- 1 Port LCD standard ETT 14PIN
- 4 Port GPIO 10PIN standard ETT
- 32KB Flash Memory and 8KB RAM
- RTC (Real Time Clock) 32.768KHz with Battery Backup +3V
- +5V Power Supply
- maximum 32 I/O Pins GPIO (only GPIO support signal 5V)Pins GPIO can be used with other Functions as following;
  - ❖ SPI 2 Channel
  - ❖ I2C 2 Channel
  - ❖ 8-Channel 10 Bit A/D Converter
  - ❖ UART Full-Duplex 2 Channel; RS232-1 and RS232-2 standard 4 Pin ETT
  - ❖ Timer 32-bit 2 Channel (7 Input Capture / 7 Output Compare)
  - ❖ Timer 16-bit 2 Channel (3 Input Capture / 7 Output Compare)
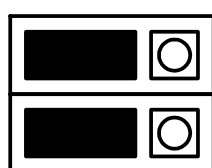 - ❖ Watchdog Timer, PWM Output

Structure of Board ET-ARM BASE2103/2106
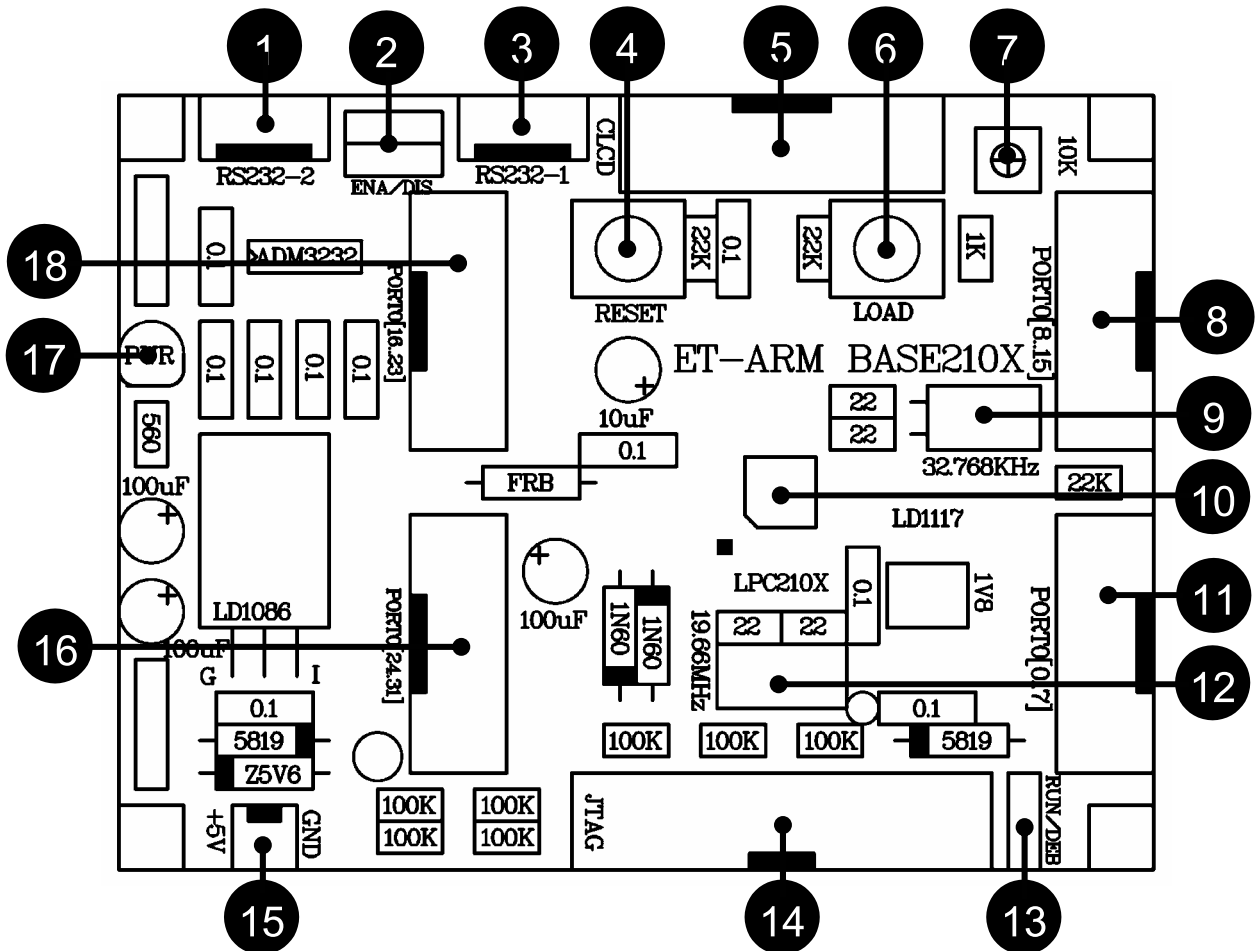
No. 1 and **3** is Port Communication RS232-2 and RS232-1 respectively.
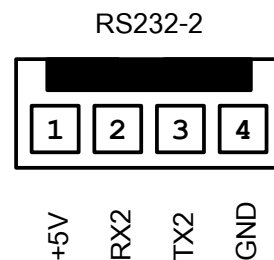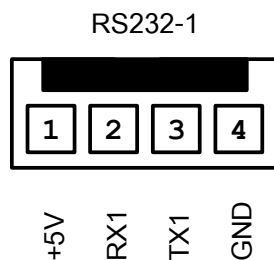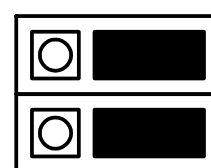
RS232-1

RS232-2

- **No. 2** is Set Jumper as Enable or Disable signal GPIO of P0.8 and P0.9 to be RS232-2 or GPIO.
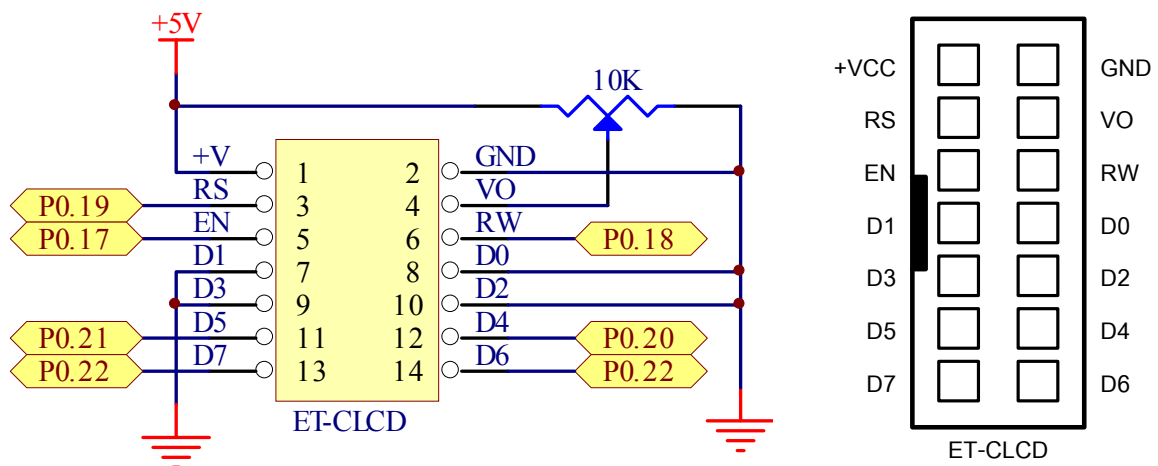

ENA/DIS

Select Jumper For RS232-2

ENA/DIS

Select Jumper For GPIO

- **No. 4** and **6** is Switch RESET and LOAD respectively.
- **No. 5** and **7** is LCD Connector 14PIN and VR-10K for contrasting the brightness of LCD Monitor respectively. Circuit and Signal is arranged as following;

- **No. 8, 11, 16,** and **18** is GPIO0 is divided into 4 Ports and has 8 Bit per Port, totally 32Bit (only GPIO can support Signal 3.3V and 5V).
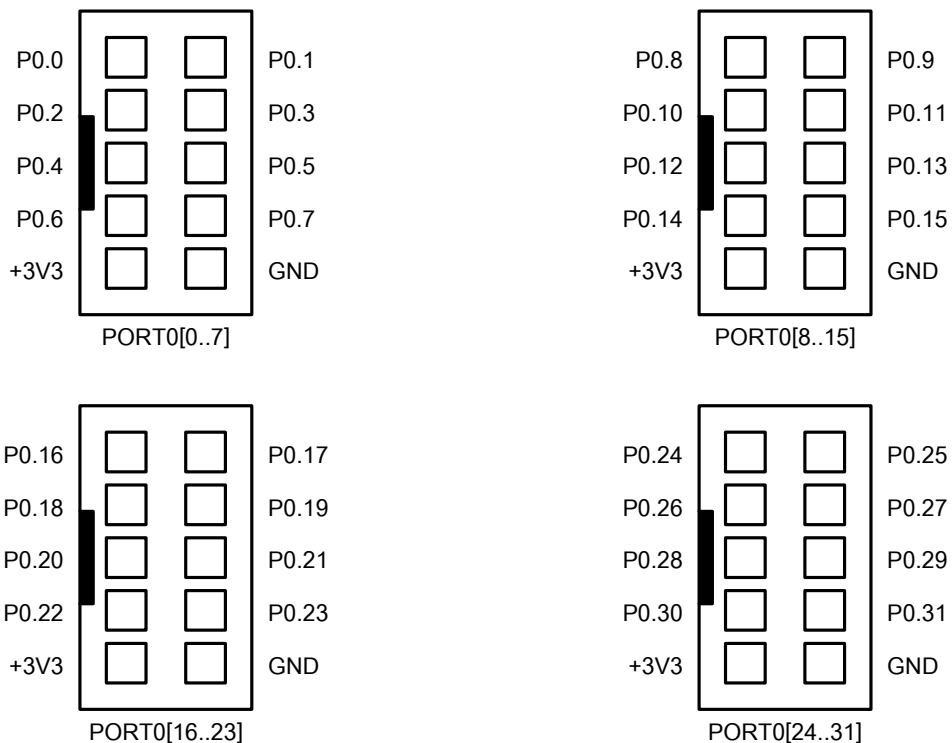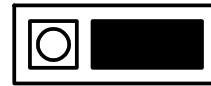

Figure displays the Signal GPIO arrangement of all 4 sets.

- No. **9 is** Crystal Oscillator 32.768 KHz for RTC (only version LPC2103).
- **No. 10 is** MCU ARM7TDMI-S LPC2103 or LPC2106 from Philips.
- **No.12** is Crystal 19.6608 MHz for MCU .
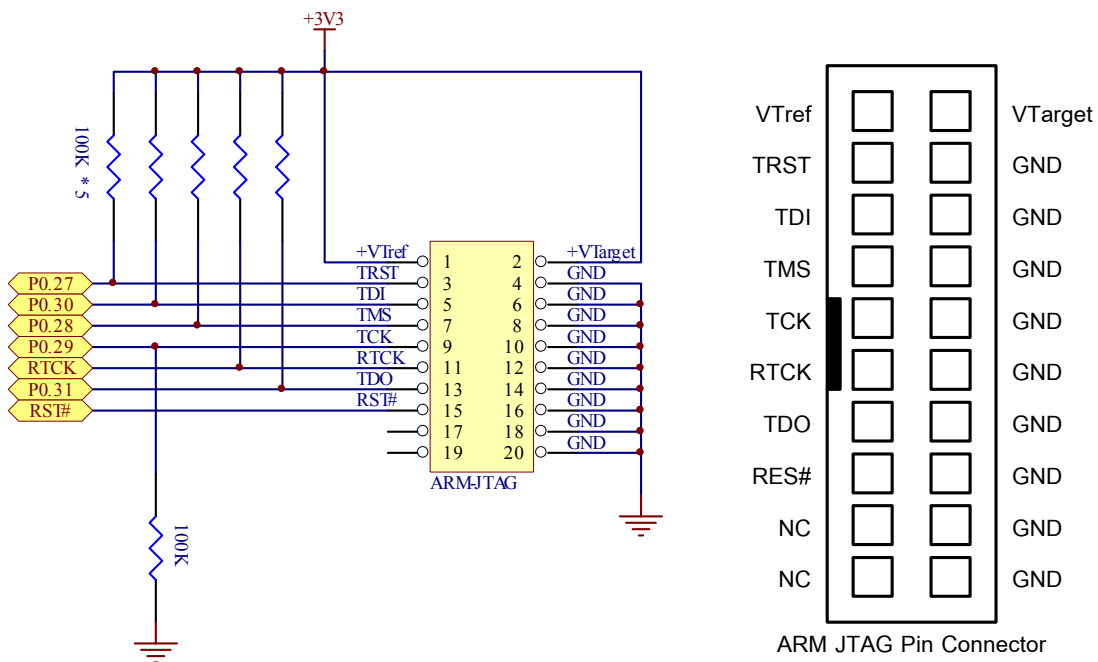- **No. 13 is** Set Jumper for selecting RUN Mode or Debugging Mode

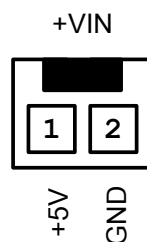
RUN/DEB   RUN/DEB
Set Jumper as Run Mode   Set Jumper as Debug Mode

- **No. 14 is** JTAG Connector 20PIN for Interfacing with JTAG Debugger. Circuit and Signal are arranged as following;

ARM JTAG Pin Connector

- **No.15** is Connecting Point of Power Supply +5V and GND for supplying only DC+5V into Board. The Connector is arranged as the picture below.


+VIN

- **No. 17** is red LED to display status operation of Power Supply.

To Download Hex File into MCU of Board

We use program **"LPC2000 Flash Utility V2.3.3"** of Philips to Download Hex File into Flash Memory of MCU internal board and we can download this Program free without any charge from www.semiconductors.philips.com. In this case, it communicates with MCU through Serial Port of computer PC.

The procedure to Download HEX File into MCU
1. Interface Cable RS232 from RS232 Serial Port of PC with Board RS232-1.
2. Supply Power +5V into Board and we can see red LED (PWR) is in status ON.
3. Run Program LPC2000 Flash Utility of Philips and it will display window as in the picture below.
4. Set configurations of program into Board ET-ARM BASE210x from ETT as shown in the picture below.
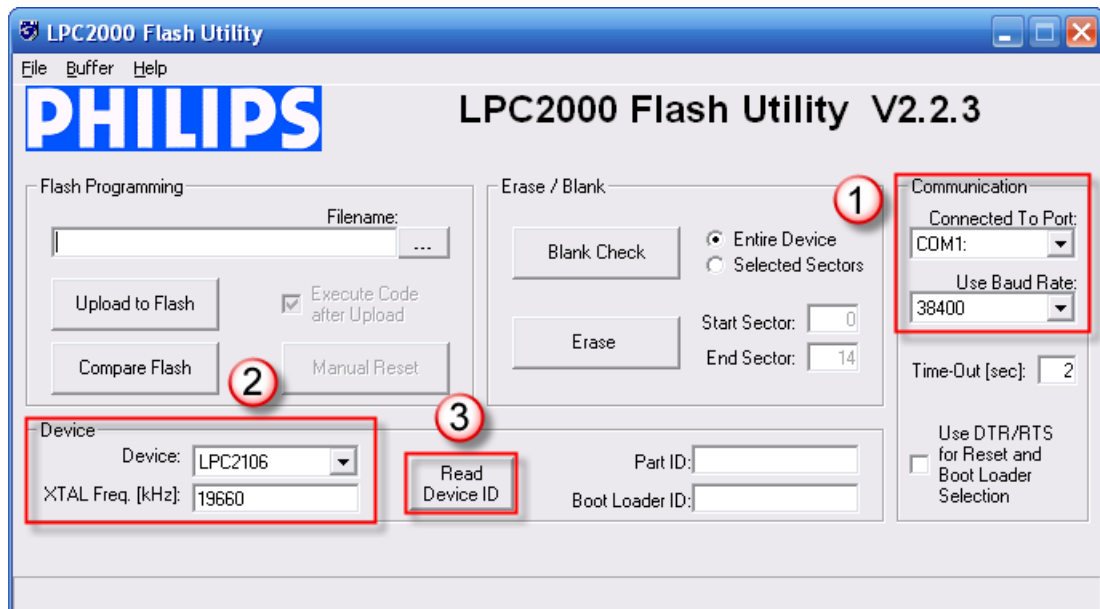
1) Select number of COM Port is corresponding with the truly usage, for example, select number as COM1.
2) Set Baud Rate value as 4800 – 38400 or setting the standard speed as 9600.
3) We can not select MCU in the Device blank; Program will display number of LPC2103 or LPC2106 automatically. (depend on the permanent MCU on Board) when we command **Read Device ID** successfully.
4) Set Crystal Oscillator value to be corresponding with the truly usage internal Board, use KHz to be unit of value and do not set more than 5 units. In this case, we set it as 19.6608MHz that equals 19660.

5) Click Button **Read Device ID** to communicate with CPU and it will display message to welcome to Boot Mode as in the picture.
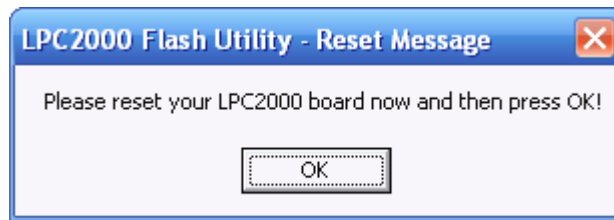
6) Press Switch RESET and LOAD on Board ET-ARM BASE210X to Reset MCU running in Mode Boot Loader as following;
   - Press Switch LOAD for a while.
   - Press Switch RESET and Switch Load remains pressing.
   - Release Switch RESET but Switch Load remains pressing
   - Finally, Release Switch LOAD and then click "OK".
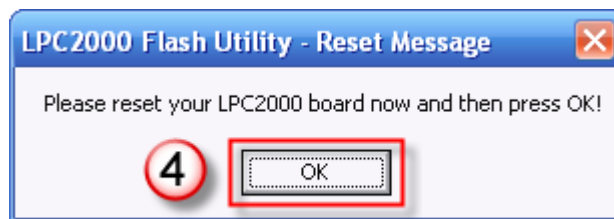
7) When we can communicate with CPU successfully, it will display window that shows the information of Part ID and Boot Loader ID as in the picture below.
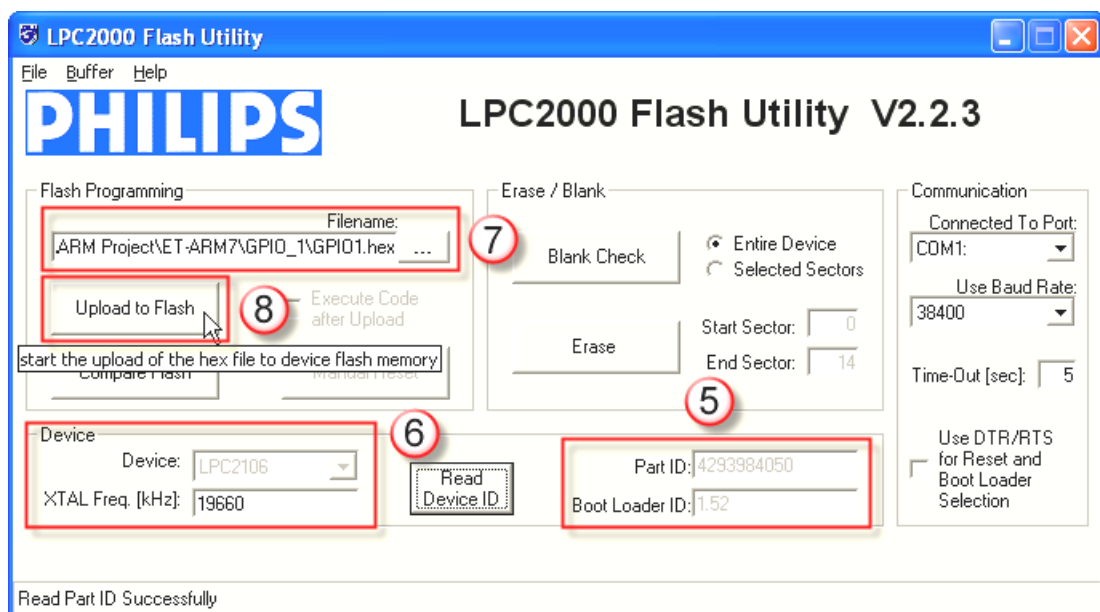
8) Select HEX File that we want to program into MCU.

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9) Click "**Upload to Flash**" and Program LPC2000 starts Download data into MCU instantly and we can notice at Status "**Uploading to LPC2000 RAM and Copying to Flash Memory**" as in the picture below. In this step, we must wait for the operation of program is completely and we can notice at Status "**File Upload Successfully Completed**"
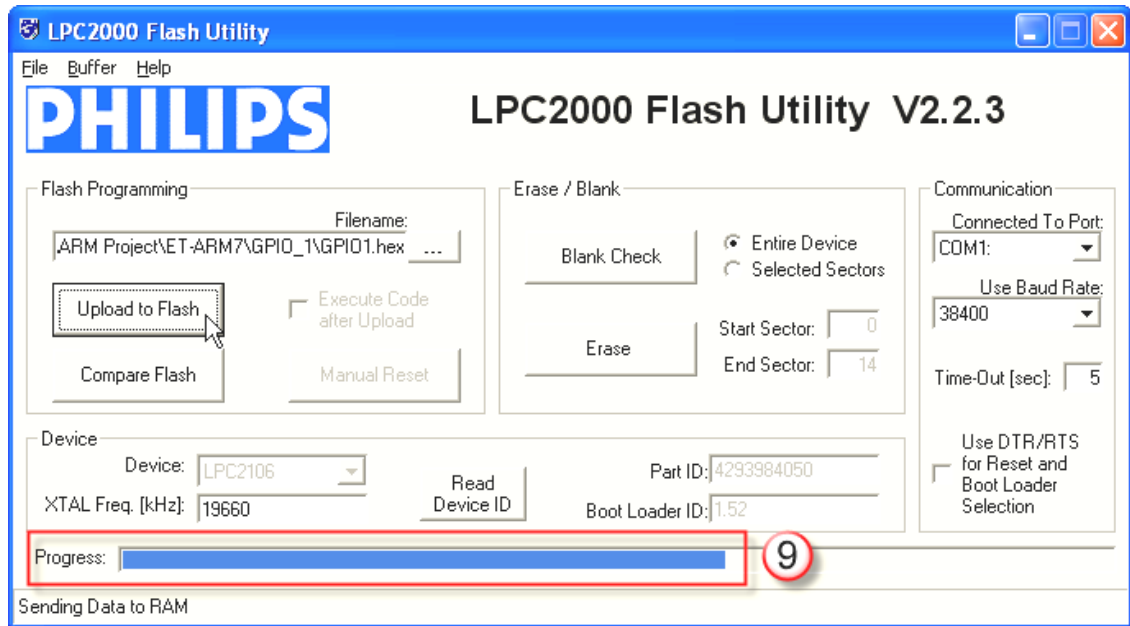
when operation of Program is completely, press Switch Reset on board and MCU starts run as the downloaded program instantly

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LPC2103/LPC2106

Title: CIRCUIT OF ET-BASE ARM LPC2103 Version 1.0(R0)

Size	Number	Revision
B		Rev.0
	ETT CO.,LTD (WWW.ETT.CO.TH)	

Date: 25-Apr-2006   Sheet 1 of 1
File: D:\My Circuit\MyCircuit.Ddb   Drawn By: Eakachai Makarn